EE 331 – BCT #1, v1

1. What is the area of a circle of radius r m?

2. What is the volume of a sphere of radius r m?

3. Write down Euler's rule (also called Euler's identity or Euler's law).

4. Sketch $y = \cosh x$.

5. Sketch $y = e^{-x}$ for $x \geq 0$.

Evaluate, simplify, convert to or from phasor form, or identify the following (eliminate any complex denominators):

6. $e^{x/2} \cdot e^{x/2} =$

7. $(\widehat{\mathbf{a}}_x \times \widehat{\mathbf{a}}_y) + (\widehat{\mathbf{a}}_z \times \widehat{\mathbf{a}}_z) =$

8. $\dfrac{4 - j}{1 - j} =$

9. $\dfrac{e^x + e^{-x}}{2} =$

10. $\dfrac{d(1/x)}{dx} =$

11. $\dfrac{d(xe^{\sin x})}{dx} =$

12. $\displaystyle\int x\, dx =$

13. $\displaystyle\int_{-0.1}^{0.1} \dfrac{x}{[x^2 + 4]^{3/2}}\,dx =$

14. $\displaystyle\int \sin^3 x \cos x\, dx =$

15. $V_s(z) = 2e^{-(1+j2)z - j\pi/3}$

16. Write down the sum of the first three *non-zero* terms of the Taylor series for e^x expanded about 0.

In the final problems, $f(x, y) = x^2 y - \cos x$, $\mathbf{A} = \widehat{\mathbf{a}}_x + 2\widehat{\mathbf{a}}_y$, and $\mathbf{B} = -2\widehat{\mathbf{a}}_y$.

17. $\dfrac{\partial f(x, y)}{\partial y} =$

18. $\dfrac{\partial^2 f(x, y)}{\partial x \partial y} =$

19. $\mathbf{A} \cdot \mathbf{B} =$

20. $|\mathbf{A} - \mathbf{B}| =$